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ABSTRACT

The Myers-Briggs Type Indicator (MBTI) is one of the most frequently used measures of personality. MBTI Form G and a self-descriptive adjectival checklist, the "Personal Preferences Self-Description Questionnaire" (PPSDQ), were administered to 191 college students. The four dimensions of personality measured by the MBTI are: Extraversion-Introversion; Sensing-iNtuiton; Thinking-Feeling; and finally, Judging-Perceiving. The purpose of our exploratory study was to evaluate whether the adjectival self-description checklist may provide a viable method of quickly obtaining initial type information. Data were analyzed by computing classical test theory reliability statistics and principal components analyses. Results are generally favorable regarding at least three of the four constructs presumed to be measured by the PPSDQ. Additional items must be formulated to tap the fourth dimension (Judging-Perceiving). Six tables and one figure are included. (Contains 17 references.) (Author/SLD)

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Concurrent Validity of Scores from an Adjectival Self-Description Checklist In Relation to Myers-Briggs Type Indicator (MBTI) Scores

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ABSTRACT

The Myers-Briggs Type Indicator (MBTI) is one of the most frequently used measures of personality. We administered MBTI Form G and a self-descriptive adjectival checklist, the Personal Preferences Self-Description Questionnaire (PPDSQ), to 191 college students. The purpose of our exploratory study was to evaluate whether the adjectival self-description checklist may provide a viable method of quickly obtaining initial type information. Data were analyzed by computing classical test theory reliability statistics and principal components analyses.

The Myers-Briggs Type Indicator (MBTI) is one of the most frequently used measures of personality, for several reasons. First, unlike many personality measures, the MBTI focuses on normal variations in personality, and because more people have normal as against abnormal personality, the measure may be useful with more people than measures of psychopathology would be. Second, many counselors find that the MBTI has enormous "face validity" for clients, i.e., that clients understand the concepts implicit in the measure, tend to agree with important aspects of type characterizations, and find the information useful and free of value judgments and non-threatening.

McCaulley (1990) provides a concise and informed overview of the MBTI, its history, and its uses. The forms of the MBTI were developed over at least four decades. Initial work was done by Katherine C. Briggs and her daughter, Isabel Briggs Myers. Mary H. McCaulley also made numerous contributions, and worked closely with Isabel in projects such as the writing of the comprehensive MBTI manual (Myers & McCaulley, 1985), which was published subsequent to Myers' death in May, 1980.

The MBTI was developed with some grounding in the basic precepts of Carl G. Jung's theory of psychological functions and types. The theory presumes that "...much of the seemingly random variation in behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment" (Myers & McCaulley, 1985, p. 1).

The MBTI is designed to measure four dimensions: Extraversion-

Introversion, Sensation-INtuition, Thinking-Feeling, and Judgment-Perception. In conventional usage, continuous scores are computed on each dimension for each preference pole of the dimension (e.g., both Extraversion and Introversion on the EI dimension), and persons are "typed" based on which style within each dimension is preferred. Each individual is then classified into one of the 16 types formed from all possible combinations of the four scales, e.g., ENTJ, ISTP, and ENFP.

MBTI items are forced-choice in nature and consist of paired statements, one from either preference pole on one of the four scales. The MBTI was designed for use with older adolescents and adults in the normal population. Most forms of the measure have roughly 100 items. Previous factor analytic investigations of MBTI data have generally been supportive of a conclusion that the instrument generally yields scores measuring the intended constructs (e.g., Thompson & Borrello, 1986).

A pair of studies reported in the Manual by Carskadon used *self-estimate* of type as a validity measure. When subjects were asked to choose the type description that best suited them, their actual MBTI-tested type was chosen to a statistically significant degree more often than chance level in both studies.

These studies prompted us to explore the utility of a short-form measure developed by the senior author; this measure is an adjectival *self-description* checklist--the Personal Preferences Self-Description Questionnaire (PPDSQ). The MBTI itself includes several items involving adjectival self-description and this, taken

with the previous research involving self-estimation of type, together suggest that adjectival self-description may provide a sufficient basis with which to tentatively identify type.

The purpose of our study was to explore (a) the reliability of PPSDQ scores and (b) the concurrent validity of PPSDQ scores in relation to MBTI continuous scores. The study was conducted as the first step in an iterative sequence of PPSDQ test revision and refinement.

Method

Subjects

We administered MBTI Form G and the PPDSQ self-descriptive adjectival checklist to 191 college students in counter-balanced order. Thus, for example, the odd-numbered subjects (1st, 3rd, 5th, etc.) completed the PPSDQ first and the MBTI second, while the even-numbered subjects (2nd, 4th, 6th, etc.) completed the MBTI first and the PPSDQ second. There were more females (71.2%) than males (28.8%) in our sample.

Instrumentation

The first edition of the PPDSQ consists of 16 adjective pairs posited to measure each of the four dimensions of personality measured by the MBTI. The resulting 64 items are presented in the repeated order: Extraversion-Introversion; then Sensing-iNtuition; Thinking-Feeling; and finally Judging-Perceiving.

However, half the 16 items measuring each of the four constructs were reversed so as to minimize response set. For example, item 1 ("Quiet-Expressive") measures EI, but the

Introversion adjective ("Quiet") is presented first within the pair. Item 5 ("Social-Private") also measures EI, but the Extraversion adjective ("Social") is presented first within this adjective pair.

Each adjective pair is presented as a semantic differential scale. A Likert scale ("1" to "7") is presented between each pair of adjectives, and subjects circle the number that best represents which adjective best describes them. Thus, unlike the MBTI which uses an "ipsative" or forced-choice response format, the PPDSQ uses a "normative" or non-forced-choice response format.

Results

Presumptions Underlying Analytic Choices

In the present study the primary analyses involved classical reliability statistics and principal components analyses. Prior to elaborating these results, some discussion of the presumptions underlying both our major analytic methods seems warranted.

The Nature of Reliability. Unlike many researchers, we consciously recognized that *reliability is a characteristic of scores or data in hand, and generally ought to be investigated for every given data set*. Many authors present this view, but paradigm influences constrain some researchers from integrating this presumption into their actual analytic practice (Thompson, 1994).

For example, Rowley (1976, p. 53, emphasis added) noted that, "It needs to be established that an instrument itself is neither reliable nor unreliable.... A single instrument can produce *scores* which are reliable, and other *scores* which are unreliable." And

Crocker and Algina (1986, p. 144, emphasis added) argue that, "...A test is not 'reliable' or 'unreliable.' Rather, reliability is a property of the *scores* on a test for a *particular* group of examinees."

In another widely respected text, Gronlund and Linn (1990, p. 78, emphasis in original) note,

> Reliability refers to the *results* obtained with an evaluation instrument and not to the instrument itself.... Thus, it is more appropriate to speak of the reliability of the "test scores" or of the "measurement" than of the "test" or the "instrument."

And Eason (1991, p. 84, emphasis added) argues that:

> Though some practitioners of the classical measurement paradigm [incorrectly] speak of reliability as a characteristic of tests, in fact reliability is a characteristic of *data*, albeit data generated on a given measure administered with a given protocol to given subjects on given occasions.

The sample itself impacts the reliability of scores. Reliability is driven by variance--typically greater scores variance leads to greater score reliability, and so more *heterogeneous* samples often lead to more *variable* scores, and thus to higher reliability. Therefore, the same measure, when administered to more heterogenous or more homogeneous sets of subjects, will yield scores with differing reliability. As Dawes

(1987, p. 486) observed, "...Because reliability is a function of sample as well as of instrument, it should be evaluated on a sample from the intended target population--an obvious but sometimes overlooked point."

Our shorthand ways of speaking (e.g., language saying "the test is reliable") can itself cause confusion and lead to bad practice. As Pedhazur and Schmelkin, 1991, p. 82, emphasis in original) observed, "Statements about *the* reliability of a measure are... inappropriate and potentially misleading." But these telegraphic ways of speaking can be problematic, if we come unconsciously to ascribe truth to our literal shorthand, rather than recognize that our jargon is sometimes telegraphic and <u>not</u> literally true. As Thompson (1992, p. 436) emphasizes:

> This is not just an issue of sloppy speaking--the problem is that sometimes we unconsciously come to think what we say or what we hear, so that sloppy speaking does sometimes lead to a more pernicious outcome, sloppy thinking and sloppy practice.

<u>The Utility of Principal Components Analyses for Informing Judgments Regarding Construct Validity</u>.

With respect to using factor analysis to help judge score *validity*, many researchers acknowledge the prominent role that factor analysis can play in efforts to establish construct validity. For example, Nunnally (1978, p. 111) noted that, historically, "construct validity has been spoken of as [both] 'trait validity' and 'factorial validity.'"

Similarly, Gorsuch (1983, p. 350) noted that, "A prime use of factor analysis has been in the development of both the operational constructs for an area and the operational representatives for the theoretical constructs." In short, "factor analysis is intimately involved with questions of validity.... Factor analysis is at the heart of the measurement of psychological constructs" (Nunnally, 1978, pp. 112-113).

But analysts differ quite heatedly over the utility of principal components as compared to common or principal factor analysis. For example, an entire special issue on this controversy was recently published in *Multivariate Behavioral Research*. The difference between the two approaches involves the entries used on the diagonal of the correlation matrix that is analyzed--principal components analysis uses ones on the diagonal while common factor analysis uses estimates of reliability, usually estimated through an iterative process.

The two methods yield increasingly more equivalent results as either (a) the factored variables are more reliable or (b) the number of variables being factored is increased. Snook and Gorsuch (1989, p. 149) explain this second point, noting that "As the number of variables decreases, the ratio of diagonal to off-diagonal elements also decreases, and therefore the value of the communality has an increasing effect on the analysis." For example, with 10 variables the 10 diagonal entries in the correlation matrix represent 10% (10 / 100) of the 100 entries in the matrix, but with 100 variables the diagonal entries represent

only 1% (100 / 10,000) of the 10,000 matrix entries. Gorsuch (1983) suggests that with 30 or more variables the differences between solutions from the two methods are likely to be small and lead to similar interpretations.

Phase #1 Reliability and Factor Analyses (v=64)

We first computed classical, corrected, item discrimination (i.e., r's between scores on each item--potentially ranging from "1" to "7"--and scores on the remaining 15 [16 -1] items in each of the four scales--potentially ranging from "15" [15 x 1] to "105" [15 x 7]) and scale alpha coefficients (cf. Thompson & Levitov, 1985). These results are reported in Table 1.

INSERT TABLE 1 ABOUT HERE.

Next, we extracted four principal components from the inter-item correlation matrix and rotated these factors to the varimax criterion. In this initial factor analysis we used both scores on the 64 PPSDQ items *plus* continuous scores on each pair of scores for each of the four scales from the MBTI (i.e., MBTI scores on E, I, S, N, T, F, J, and P). Thus, this analysis involved 72 items. These results are presented in Table 2. The items are sorted into the four scales (i.e., SN, TF, EI, and JP) presumed to be measured by the PPSDQ.

INSERT TABLE 2 ABOUT HERE.

As noted in Tables 1 and 2, a total of 17 (2 + 2 + 2 + 11) items were deemed to have unacceptable item-total or structure

coefficients. One additional item (#55, "Skeptical-Trusting") appears to be a reasonable measure of the JP scale, rather than the TF scale the item was originally conceptualized to measure, and this item was retained in further analyses as a marker for the JP scale. Thus, a total of 47 items (14 + 14 + 13 + 6) were retained in the subsequent phase of analyses.

Phase #2 Reliability and Factor Analyses with v=47 Retained Items

Table 3 presents the reliability analyses associated with the reduced item set and the movement of item #55 to the JP scale. Figure 1 presents a "scree" plot of the eigenvalues of the correlation matrix involving these 47 items; the plot suggests that a four-factor solution may be defensible. Table 4 presents a principal components analysis of these 47 items.

INSERT TABLES 3 AND 4 AND FIGURE 1 ABOUT HERE.

Table 5 presents concurrent validity coefficients involving pairs of (a) the 8 MBTI scale scores, (b) factor scores on the four components presented in Table 4, and (c) raw scores computed by adding item responses on the 14, 14, 13 or 6 items defining each scale, as delineated in Table 3.

INSERT TABLE 5 ABOUT HERE.

Exploratory analyses were also conducted using covariance structure analyses. The bivariate correlation matrix involving (a) the 8 MBTI scale scores and (b) the 4 raw scores computed by adding item responses on the 14, 14, 13 or 6 items defining each revised

PPDSQ scale was the basis for these LISREL analyses (Jöreskog & Sörbom, 1989). Table 6 presents the relevant parameter estimates.

INSERT TABLE 6 ABOUT HERE.

The *a priori* model positing the existence of four correlated factors yielded a χ^2 of 208.65 (df = 48; noncentrality parameter = 208.65 - 48 = 160.65; 160.65/48 = 3.34). The LISREL goodness-of-fit index (GFI) was .85.

Discussion

Prior to interpreting these results, some preliminary comments are necessary. The present study was exploratory in nature, and intended to offer initial insights regarding the psychometric properties of the Personal Preferences Self-Description Questionnaire (PPDSQ). However, it still must be acknowledged that the sample size in this initial study was somewhat small in relation to the number of variables examined. Thus, these conclusions must be interpreted with caution.

And, in any case, no one study taken alone should be overinterpreted. As Neale and Liebert (1986, p. 290) observed:

> No one study, however shrewdly designed and carefully executed, can provide convincing support for a causal hypothesis or theoretical statement... Too many possible (if not plausible) confounds, limitations on generality, and alternative interpretations can be offered for any one observation. Moreover, each of the basic methods of

> research (experimental, correlational, and case study) and techniques of comparison (within- or between-subjects) has intrinsic limitations. How, then, does social science theory advance through research? The answer is, by collecting a diverse body of evidence about any major theoretical proposition.

Nevertheless, some tentative conclusions can be offered, based on these results. First, as indicated by Table 3, it is possible to derive scores from the PPSDQ that have reasonable internal consistency. The most problematic of the four scales, from this perspective, is the JP scale. It appears that more items are needed to measure this scale.

The factor analytic results reported in Table 4 are also favorable regarding a conclusion that PPSDQ scores have reasonable validity. Four dimensions appear to be measured, and measured in the expected manner. Of course, these analyses need to be replicated.

The Table 5 concurrent validity coefficients are also generally positive. Again, the most troubling results involved the JP scale, which had low concurrent validity coefficients as regards both PPDSQ factor scores (r's = +.1296 and -.1196) and summated raw scale scores (r's = -.0425 and +.0286).

With respect to the confirmatory factor analysis of scale scores, reported in Table 6, the factor structure parameter for the PPSDQ JP scale (+.042) is disproportionately small, and again

signals difficulty with this scale.

In summary, results in the present study were generally favorable regarding at least three of the four constructs presumed to be measured by the PPSDQ. Additional items need to be formulated to tap the fourth (JP) dimension. At this juncture, what is recommended is further research using the original 64 PPSDQ items together with additional items. This would allow both replication of the present results, as well as exploration of improvements resulting from use of an additional set of JP items.

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Table 1
Reliability and Item Statistics for
v=16+16+16+16=64 Items (n=191)

Introversion-Extraversion (v=16)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
1 EI-	QuietExpressive	.6884	.8463
5 EI+	SocialPrivate	.7161	.8435
9 EI-	ReflectiveActive	.2482	.8669
13 EI+	FriendlyDistant	.4575	.8576
17 EI-	*DeepBroad*	*-.1233*	*.8821*
21 EI+	PersonableShy	.7092	.8445
25 EI-	TerseWordy	.3449	.8630
29 EI+	ApproachableMysterious	.3690	.8620
33 EI-	IntrovertExtrovert	.6336	.8487
37 EI+	MixerLoner	.7718	.8420
41 EI-	StillAnimated	.4225	.8591
45 EI+	CongenialReclusive	.4924	.8565
49 EI-	SolitaryAmicable	.5045	.8554
53 EI+	ExuberantSerene	.3781	.8608
57 EI-	SilentGabby	.6573	.8472
61 EI+	GregariousTimid	.6326	.8497

α = 0.8637

Sensing-iNtuition (v=16)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
2 SN+	RealisticIntuitive	.4946	.7832
6 SN-	InsightfulSystematic	.3768	.7919
10 SN+	PracticalImaginative	.6708	.7687
14 SN-	RandomSequential	.4697	.7852
18 SN+	*EnjoymentAnticipation*	*-.0349*	*.8195*
22 SN-	VarietyRepitition	.4426	.7873
26 SN+	*SensualInnovative*	*-.1162*	*.8236*
30 SN-	GlobalMeticulous	.2473	.7998
34 SN+	TraditionalCreative	.5550	.7780
38 SN-	InventiveOrganized	.5627	.7771
42 SN+	DirectedIngenious	.4374	.7882
46 SN-	DiversityConsistency	.4712	.7852
50 SN+	PlanfulVisionary	.5932	.7760
54 SN-	DiversePrecise	.3395	.7946
58 SN+	PracticalTheoretical	.4869	.7846
62 SN-	ConceptualReal	.4072	.7899

α = 0.8009

Table 1 (cont.)

Thinking-Feeling (v=16)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
3 TF-	EmpathyLogic	.5133	.8305
7 TF+	DispassionateEmotional	.6447	.8238
11 TF-	*SubjectiveObjective*	*.0974*	*.8509*
15 TF+	JusticeHarmony	.4188	.8360
19 TF-	CaringCool	.5974	.8265
23 TF+	ImpersonalPersonal	.3496	.8389
27 TF-	SympathyFairness	.5216	.8300
31 TF+	PrinciplesPeople	.3907	.8376
35 TF-	KindAnalytical	.5593	.8286
39 TF+	FactualCompassionate	.5773	.8274
43 TF-	FeelingThinking	.6410	.8227
47 TF+	LogicalHumane	.4563	.8338
51 TF-	TenderRational	.6050	.8251
55 TF+	SkepticalTrusting	.2804	.8450
59 TF-	*BenevolentImpartial*	*.1171*	*.8499*
63 TF+	StrictForgiving	.5836	.8267

α = 0.8424

Judging-Perceiving (v=16)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
4 JP+	ResponsibleAdaptable	.3217	.7512
8 JP-	FlexibleOrganized	.4383	.7403
12 JP+	DecisiveCurious	.3101	.7524
16 JP-	ImpulsiveDeliberate	.2920	.7535
20 JP+	EvaluativeOpen	.3456	.7490
24 JP-	*SnoopySelective*	*.0237*	*.7727*
28 JP+	JudgingPerceiving	.3283	.7505
32 JP-	CarefreeDemanding	.4958	.7351
36 JP+	RigorousNonjudgmental	.3701	.7469
40 JP-	InquisitiveCritical	.3893	.7457
44 JP+	PromptFree-spirited	.4339	.7405
48 JP-	ImpetuousTask-oriented	.3863	.7459
52 JP+	TimelyRelaxed	.4646	.7380
56 JP-	AcceptingDiscriminating	.2749	.7548
60 JP+	PickyInquiring	.2782	.7551
64 JP-	LightheartedPrudent	.4638	.7390

α = 0.7604

Note. Items with negative signs in the "Scale" column (e.g., Item 1, an "EI-" item) were reverse scored for the reliability analyses. Items with aberrant, unacceptable item-total statistics are *italicized*.

Table 2
Varimax-Rotated Factor Pattern/Structure Matrix
for v=64+8=72 Items (n=191)

Variable Name	Factor I	II	III	IV
QUIETEXP	.28328	-.01293	-.73026	.11465
SOCPRIVA	-.09583	.10176	.76947	-.04457
REFLECAC	-.13822	.30158	-.42994	-.21352
FRIEDIST	.17308	.31830	.52059	.21037
DEEPBROA	-.15660	.19674	.09625	.21725
PERSNSHY	-.19458	.06885	.77400	.11946
TERSEWOR	.30899	-.17630	-.34579	.37085
APPROACH	.24651	.07866	.48608	.11945
INTREXTR	.12872	-.15971	-.65524	.00506
MIXERLON	-.02863	.08923	.82738	.09180
STILLANI	.38563	-.09245	-.42797	.08570
CONGRECL	.09256	.10702	.56617	.12884
SOLIAMIC	.02799	-.26778	-.53170	.00946
EXUBSERE	-.00085	-.04614	.42193	.02164
SILENGAB	.21165	-.20160	-.65758	.43058
GREGARTI	-.22433	.00923	.66520	.04476
MBTIINTR	-.14869	.04484	.81696	-.04093
MBTIEXTR	.13146	-.03659	-.82332	.06553
REALINTU	.53327	-.21737	.02860	.14744
INSIGHTS	-.39844	.25190	.21398	.30458
PRACIMAG	.67865	-.22874	-.11100	.05444
RANDSEQU	-.61748	.06726	.05130	.03458
ENJOYANT	-.00371	.17353	.17814	.30029
VARIREPI	-.50929	.05354	.18572	.38558
SENSUALI	-.14058	.41947	.07988	-.07758
GLOBMETI	-.30038	-.05594	.11255	.21435
TRADCREA	.55249	-.15498	-.12320	-.05764
INVENORG	-.68847	-.10767	.01840	-.11713
DIRECTIN	.52092	.08207	-.02478	.09086
DIVERCON	-.52222	-.00129	.09914	.19166
PLANVISI	.66410	-.05749	-.08991	-.09901
DIVERPRE	-.37919	.02695	.02404	.18900
PRACTHEO	.54766	-.18069	-.02097	.24390
CONCEPRE	-.47871	.05529	-.06356	-.17141
MBTISENS	-.66171	.12935	.05440	.07307
MBTIINTU	.67483	-.13477	-.04105	-.03047

Table 2 (cont.)

EMPATHLO	-.06246	.57803	.01635	-.10314
DISPASEM	-.02517	-.70718	-.15036	-.03858
SUBJOBJE	-.13194	.15637	.01949	-.31661
JUSTHARM	.03370	-.52420	-.06193	.09270
CARICOOL	.11637	.62776	.11972	.24217
IMPERPER	-.01959	-.34803	-.40455	-.10879
SYMPATHY	-.02159	.61648	.02647	-.19240
PRINCIPL	.15353	-.39492	-.26441	-.09776
KINDANAL	.11061	.61683	.09316	.11217
FACTCOMP	.07749	-.66079	-.03715	-.11827
FEELTHIN	-.09527	.69727	.13249	-.09692
LOGICHUM	.28088	-.54975	-.03346	.18987
TENDERRA	-.16420	.66394	-.03701	.12425
SKEPTRUS	-.08155	-.28967	-.12212	-.55225
BENEVIMP	.03201	.14224	.10207	-.12780
STRICTFO	.01939	-.64387	-.05385	-.31023
MBTITHIN	-.01380	.84774	.05344	.17483
MBTIFEEL	.09017	-.84604	-.06554	-.06973
RESPADAP	.50269	-.02460	.05284	.25793
FLEXORGA	-.57399	-.04384	-.00665	.11776
DECICURI	.40895	-.17661	.12170	.07896
IMPULDEL	-.45625	.10310	.07971	-.07473
EVALOPEN	.13985	-.38625	-.13229	-.24145
SNOOPYSE	-.06794	.06503	-.03717	-.27223
JUDGPERC	.11867	-.24606	.07735	-.54227
CAREFREE	-.45555	.26487	.13927	.25821
RIGNONJU	.08164	-.51145	.07346	-.36218
INQUICRI	-.27983	.26768	.03197	.34639
PROMPTFR	.62609	-.08004	-.17741	.04298
IMPETTAS	-.57172	-.01709	.03202	-.03695
TIMELYRE	.44032	-.10632	.05524	-.19756
ACCEPDIS	.04723	.44778	.05401	.52930
PICKYINQ	.22752	-.08437	.06466	-.44705
LIGHTHEA	-.19953	.50631	.13369	.23678
MBTIJUDG	-.75814	-.14075	.05350	.07727
MBTIPERC	.73524	.16599	-.10929	-.06856

Note. In this analysis the factors appeared in the order: SN, TF, EI, and JP. Items deemed to not have reasonable coefficients are underlined. No items were reverse scored in this analysis, so it was expected that roughly half the items on each scale would have negative structure coefficients, **in an alternating order**.

Table 3
Reliability and Item Statistics for
v=14+14+13+6=47 Items (n=191)

Introversion-Extraversion (v=14)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
1 EI-	QuietExpressive	.6880	.8689
5 EI+	SocialPrivate	.7161	.8667
9 EI-	ReflectiveActive	.2584	.8886
13 EI+	FriendlyDistant	.4715	.8791
21 EI+	PersonableShy	.7456	.8654
29 EI+	ApproachableMysterious	.3739	.8843
33 EI-	IntrovertExtrovert	.6319	.8715
37 EI+	MixerLoner	.7839	.8640
41 EI-	StillAnimated	.4272	.8812
45 EI+	CongenialReclusive	.5068	.8778
49 EI-	SolitaryAmicable	.5174	.8771
53 EI+	ExuberantSerene	.3685	.8834
57 EI-	SilentGabby	.6280	.8717
61 EI+	GregariousTimid	.6379	.8718

α = 0.8833

Sensing-iNtuition (v=14)

No. Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
2 SN+	RealisticIntuitive	.5077	.8329
6 SN-	InsightfulSystematic	.4153	.8386
10 SN+	PracticalImaginative	.6950	.8199
14 SN-	RandomSequential	.4920	.8340
22 SN-	VarietyRepitition	.4842	.8345
30 SN-	GlobalMeticulous	.2484	.8472
34 SN+	TraditionalCreative	.5626	.8292
38 SN-	InventiveOrganized	.5599	.8294
42 SN+	DirectedIngenious	.4536	.8364
46 SN-	DiversityConsistency	.4951	.8338
50 SN+	PlanfulVisionary	.5960	.8273
54 SN-	DiversePrecise	.3223	.8444
58 SN+	PracticalTheoretical	.4918	.8341
62 SN-	ConceptualReal	.4142	.8385

α = 0.8445

Table 3 (cont.)

Thinking-Feeling (v=13)

No.	Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
3	TF-	EmpathyLogic	.5161	.8552
7	TF+	DispassionateEmotional	.6422	.8480
15	TF+	JusticeHarmony	.4311	.8607
19	TF-	CaringCool	.5887	.8512
23	TF+	ImpersonalPersonal	.3442	.8639
27	TF-	SympathyFairness	.5166	.8551
31	TF+	PrinciplesPeople	.3911	.8630
35	TF-	KindAnalytical	.5494	.8534
39	TF+	FactualCompassionate	.6025	.8502
43	TF-	FeelingThinking	.6552	.8463
47	TF+	LogicalHumane	.4820	.8575
51	TF-	TenderRational	.6203	.8487
63	TF+	StrictForgiving	.5775	.8515

α = 0.8640

Judging-Perceiving (v=6)

No.	Scale	Adjective Pair	Corrected Item-Total r	alpha if Item Deleted
28	JP+	JudgingPerceiving	.5481	.6508
36	JP+	RigorousNonjudgmental	.4625	.6741
40	JP-	InquisitiveCritical	.4366	.6825
56	JP-	AcceptingDiscriminating	.5294	.6547
60	JP+	PickyInquiring	.3573	.7070
55	TF+	SkepticalTrusting	.3947	.6997

α = 0.7168

Note. Items with negative signs in the "Scale" column (e.g., Item 1, an "EI-" item) were reverse scored for the reliability analyses.

Table 4
Varimax-Rotated Factor Pattern/Structure Matrix
for v=14+14+13+6=47 Items (n=191)

Variable Name	Factor I	II	III	IV
QUIETEXP	-.71989	.01706	.30702	.09881
SOCPRIVA	.77104	-.08970	-.10618	-.05373
REFLECAC	-.40373	-.33748	-.15823	-.12543
FRIEDIST	.55682	-.28538	.22293	.20077
PERSNSHY	.78371	-.03638	-.20187	.11929
APPROACH	.50360	-.07990	.31984	.09440
INTREXTR	-.65905	.15360	.17222	.00075
MIXERLON	.83161	-.05645	-.03441	.05646
STILLANI	-.42997	.07159	.45888	.01749
CONGRECL	.59609	-.08244	.12415	.10319
SOLIAMIC	-.55582	.25552	.07974	.02200
EXUBSERE	.45917	.07069	.06329	.07779
SILENGAB	-.65652	.23028	.26160	.38395
GREGARTI	.67849	.03833	-.26051	.07888
REALINTU	.05577	.21806	.63330	.03831
INSIGHTS	.22469	-.19213	-.36755	.37599
PRACIMAG	-.11726	.18692	.73663	-.11059
RANDSEQU	.06302	-.03700	-.54102	.13038
VARIREPI	.21657	.03624	-.42717	.45662
GLOBMETI	.12580	.11593	-.21747	.32005
TRADCREA	-.10159	.13681	.61529	-.15268
INVENORG	.00356	.11548	-.69637	-.01974
DIRECTIN	.00957	-.12569	.59495	-.01216
DIVERCON	.09651	.07251	-.49515	.32675
PLANVISI	-.08937	.04815	.65106	-.18401
DIVERPRE	.06738	.00852	-.29456	.26753
PRACTHEO	.00560	.19609	.61790	.11022
CONCEPRE	-.07354	-.03467	-.55053	-.05160
EMPATHLO	.02435	-.59668	-.08161	-.01692
DISPASEM	-.17347	.69655	-.01715	-.11374
JUSTHARM	-.07105	.53694	.04675	.02772
CARICOOL	.11898	-.60686	.13562	.33254
IMPERPER	-.43101	.33536	-.05984	-.12984
SYMPATHY	.05294	-.62889	-.03783	-.07633
PRINCIPL	-.27814	.39075	.14910	-.14642
KINDANAL	.09658	-.60901	.13181	.18498
FACTCOMP	-.03382	.65367	.08242	-.22138
FEELTHIN	.14588	-.71098	-.09403	-.00025
LOGICHUM	-.02499	.57784	.35606	.07379
TENDERRA	-.00293	-.64401	-.14783	.22900
STRICTFO	-.06648	.59494	-.04758	-.41959

Table 4 (cont.)

JUDGPERC	.06380	.14900	.06665	-.60667
RIGNONJU	.07899	.44647	.04122	-.43736
INQUICRI	.04432	-.19662	-.30607	.44293
ACCEPDIS	.09134	-.36627	.17036	.64295
PICKYINQ	.02840	.03582	.17827	-.47103
SKEPTRUS	-.13996	.21769	-.15974	-.57653

Table 5
Concurrent Validity and Other Correlation Coefficients
(n=191)

	FACTOR1	FACTOR2	FACTOR3	FACTOR4	INTERNEX	SENSINTU	THINFEEL	JUDGEPER	MBTIEXTR	MBTIINTR	MBTISENS
FACTOR1	1.0000										
FACTOR2	.0000	1.0000									
FACTOR3	.0000	.0000	1.0000								
FACTOR4	.0000	.0000	.0000	1.0000							
INTERNEX	**.9804****	-.1034	-.1256	.0193	1.0000						
SENSINTU	-.1195	.0758	**.9314****	-.2598**	-.2361**	1.0000					
THINFEEL	-.1824*	**.9462****	.0856	-.1887**	-.2841**	.2296**	1.0000				
JUDGEPER	-.0315	.3629**	.0566	**-.8205****	-.1160	.2343**	.4658**	1.0000			
MBTIEXTR	**-.7288****	.0447	.1562*	.0592	**-.7453****	.2308**	.1776*	.0065	1.0000		
MBTIINTR	**.7196****	-.0568	-.1679*	-.0366	**.7386****	-.2503**	-.1947**	-.0157	**-.9488****	1.0000	
MBTISENS	.0490	-.0982	**-.6125****	.1568*	.1271	**-.6476****	-.1715*	-.1883**	-.1701*	.2121**	1.0000
MBTIINTU	-.0456	.1104	**.6184****	-.1292	-.1284	**.6496****	.1748*	.1751*	.1480*	-.1685*	**-.9104****
MBTITHIN	.0783	**-.7680****	.0213	.2809**	.1597*	-.1326	**-.7890****	-.5015**	-.1077	.1228	.1802*
MBTIFEEL	-.1040	**.7614****	.0801	-.1673*	-.1988**	.1911**	**.7762****	.4297**	.0872	-.0938	-.2020**
MBTIJUDG	.0723	.1272	**-.5591****	**.1294**	.1169	**-.5872****	.0098	**-.0425**	-.1082	.1473*	**.4083****
MBTIPERC	-.1318	-.1514*	**.5293****	**-.1196**	-.1698*	**.5566****	-.0246	**.0286**	.1432*	-.1579*	**-.3691****

	MBTIINTU	MBTITHIN	MBTIFEEL	MBTIJUDG	MBTIPERC
MBTIINTU	1.0000				
MBTITHIN	-.1366	1.0000			
MBTIFEEL	.1862**	**-.8760****	1.0000		
MBTIJUDG	**-.4140****	-.0285	-.0086	1.0000	
MBTIPERC	**.3968****	.0816	-.0271	**-.9575****	1.0000

* p < .05 (2-tailed) ** p < .01 (2-tailed)

Note. Concurrent validity coefficients are both underlined and bolded.

Table 6
LISREL Maximum Likelihood Parameter Estimates

LAMBDA X (Factor Structure)

	EXTRINTR	SENSINTU	THINFEEL	JUDGPERC
INTERNEX	0.762	0.000	0.000	0.000
MBTIEXTR	-0.975	0.000	0.000	0.000
MBTIINTR	0.973	0.000	0.000	0.000
SENSINTU	0.000	0.690	0.000	0.000
MBTISENS	0.000	-0.954	0.000	0.000
MBTIINTU	0.000	0.952	0.000	0.000
THINFEEL	0.000	0.000	0.837	0.000
MBTITHIN	0.000	0.000	-0.942	0.000
MBTIFEEL	0.000	0.000	0.929	0.000
JUDGEPER	0.000	0.000	0.000	0.042
MBTIJUDG	0.000	0.000	0.000	-0.997
MBTIPERC	0.000	0.000	0.000	0.961

PHI (Factor Correlations)

	EXTRINTR	SENSINTU	THINFEEL	JUDGPERC
EXTRINTR	1.000			
SENSINTU	-0.195	1.000		
THINFEEL	-0.135	0.202	1.000	
JUDGPERC	-0.134	0.450	-0.016	1.000

Figure 1
"Scree" Plot for y=14+14+13+6=47 Items